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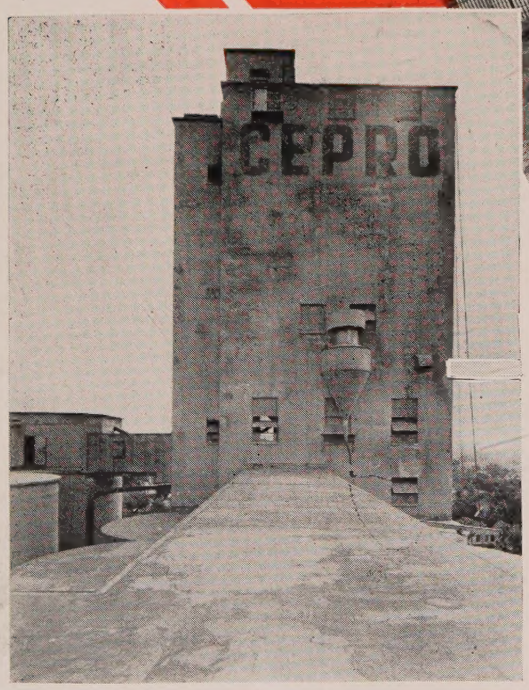

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SOGES CHAPTER MEETING DATES

1st TUESDAY—Minnesota SOGES Chapter. Harmon F. Norton, Apple River Mill Co., Minneapolis, President; James Auld, Hales & Hunter Co., St. Louis Park, Secretary.

2nd TUESDAY — Omaha-Council Bluffs SOGES Chapter. Charles F. Walker, Archer-Daniels-Midland Co., Council Bluffs, President; John T. Goetzinger, Rosenbaum Brothers, Omaha, Secretary.

2nd FRIDAY—Central States SOGES Chapter. M. M. Darling, Acme-Evans Co., Indianapolis, President; N. R. Adkins, Purina Mills, Lafayette, Ind., Secretary.

3rd TUESDAY—Kansas City SOGES Chapter. Orin Kinman, Cargill, Inc., President; George D. Duncan, Standard Milling Co., Secretary.

3rd TUESDAY — Chicago SOGES Chapter. Leonard Danielson, Arcady Farms Milling Co., President; Lincoln Scott, Corn Products Refining Co., Chicago, Secretary.

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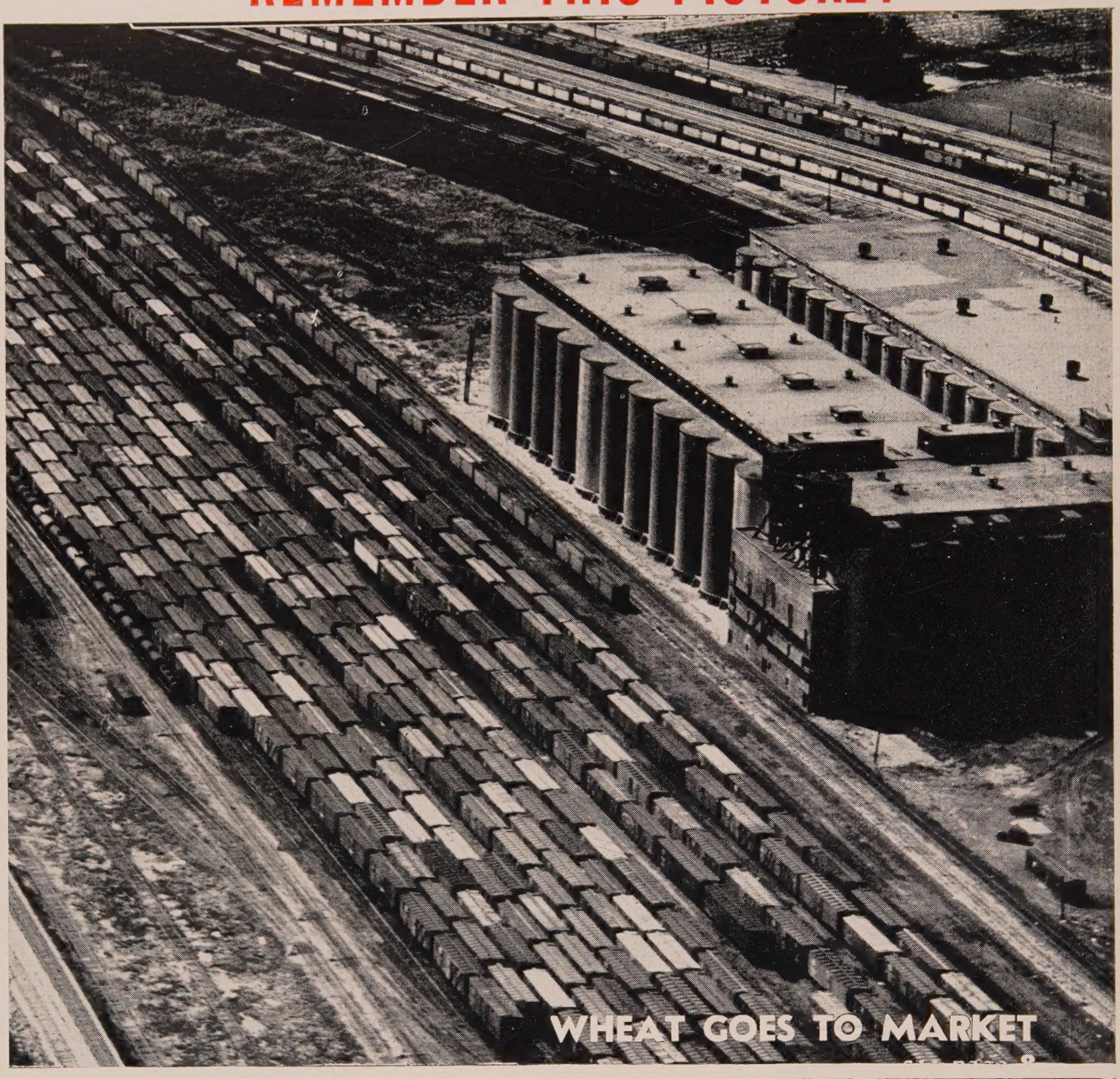

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FACTORS PRODUCING SICK WHEAT IN STORAGE

By EDWARD P. CARTER and GEORGE Y. YOUNG
Assistant Pathologists, Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, U.S.D.A., in **Cereal Chemistry,**

"Sick" wheat is being discovered on a broadening "front" again this year—is being found where least expected. As these authors point out, even 12.2 per cent moisture content is no guarantee that "sick" wheat won't develop from a reduction in oxygen pressure in large storage tanks—among other unknown causes.

The cause of "sick" wheat, as distinct from heat damage or other forms of damage of high moisture wheat in storage, is not known. It seems to occur only when wheat is stored in large quantities and makes its appearance only after a considerable time. Its occurrence in deep bins has suggested to some workers that anærobic rather than ærobic respiration is a factor of primary importance.

D. A. Coleman thought that the "sick" condition might be caused by the by-products of slowly developing fermentation. He found that moderately moist wheat (15 per cent) stored at temperatures between 70° and 85°F. will develop a wet or dank odor sometimes associated with "sick" wheat.

Thomas (1937) showed experimentally that certain fungi commonly found on sound grain may, under suitable conditions of temperature and moisture, elaborate by-products that are toxic to the wheat embryo and kill it. He called such wheat "sick" wheat, but whether it is identical with or similar to the "sick" wheat of commerce is not stated.

Swanson (1926) found that the milling and baking qualities of dead wheat were poor, caused by a granular and brittle gluten. Kuhl (1941), reporting on the effects of cereal fats and free fatty acids on the baking capacity of flour, stated that the addition of relatively large amounts of free fatty acids impaired the quality of the gluten. Swanson (1934) found that mould growth could be inhibited by the entire exclusion of air from the storage container. Most wheat so stored showed little or no visible signs of damage, but viability, acidity, and baking quality were seriously aected. It was found that the period of storage was important, the severity of damage increasing with time in storage.

Swanson states that "sick" wheat developed in many of the moist samples stored in sealed containers. Zeleny and Coleman (1938) showed that the determination of fat acidity (milligrams potassium hydroxide necessary to neutralize the free fatty acids in 100 g of grain [dry weight] may be used as a good index of soundness and extent of deterioration in wheat and other cereals, being better in this respect than other methods for determining titratable acidity. This test has been used by Zeleny (1940) for determining the soundness of corn in experimental storage.

During an investigation of the causes of heating of moist wheat, it was observed that wheat in sealed vacuum flasks sometimes became sour without heating. Since this wheat resembled "sick" wheat in many ways it seemed desirable to investigate the matter further.

Experiments accordingly were undertaken in which wheat containing different quantities of moisture was stored in sealed quart glass jars at different temperatures in temperature-controlled cabinets in the laboratory for various periods of time and then examined for evidence of "sick" wheat. The purpose of this paper is to report the results of these experiments.

Soft red winter wheat of the Fulcaster type, Grade No. 1, was used in these experiments. This wheat when purchased germinated 90 per cent or more and had a low fat acidity characteristic of sound wheat, but slight deterioration between date of purchase and time of use was found to have occurred in certain instances as will be noted later.

Three experiments were conducted with wheat containing 12.2, 16.2 and 18.6 per cent moisture respectively at each temperature level and two were conducted with moisture contents of 14.9 and 15.4 per cent at temperatures ranging from 5° to 25°C. only. Usually four to eight jars of each moisture series were placed in each temperature cabinet.

After different periods of storage, the jars were removed from the cabinets, and the wheat examined for signs of fungus growth. Any jar containing wheat with visible mould growth was discarded. For each sampling, one of the remaining jars from each temperature was opened and the contents of each thoroughly mixed and divided into two aliquots by passing through a grain divider three times. One aliquot was dried to about 8 per cent moisture on top of a warm oven and then placed in seed envelopes for determining of "sick" or otherwise damaged wheat. The second aliquot was used for determination of moisture content, germination, and fat acidity.

That the jars were actually sealed airtight is indicated by the fact that the moisture content of the wheat at the end of each experimental storage period did not vary more than 0.1 per cent from that at the start of the period.

The moisture content of the wheat was determined by drying in a vacuum oven for 12 days at 80°C. Germination tests of duplicate samples of 50 kernels each were made on moist blotters in petri dishes at 10°C. Fat acidity determinations were conducted in duplicate according to the method suggested by Zeleny and Coleman (1938) and by Zeleny (1939), the average of two determinations being reported as the number of milligrams of potassium hydroxide necessary to neutralize the free fatty acids from 100 g. of grain (dry basis).

"Sick" wheat is reported as the percentage of the kernels having the characteristic appearance of "sick" wheat as determined visually by the Board of Grain Supervisors, Grain Products Branch, War Food Administration, U.S.D.A.

There were no visual symptoms of the "sick" condition in wheat with a moisture content of 12.2 per cent when stored at temperatures less than 40°C., and then only after 279 days' storage at

which time 11 per cent of the kernels were classified as "sick." At the end of 391 days when the experiment was discontinued, 40 per cent of the kernels were so classified. The fat acidity determinations, however, increased at all temperatures.

With temperatures above 20° there was a marked increase in fat acidity, especially with the longer period of storage. Viability was not materially affected with temperatures of less than 35°C., and then only after prolonged (279 days) storage, but rapidly declined to zero when stored at 40°C. There is obviously a high positive correlation between the increase in fat acidity and percentage of "sick" kernels, and an equally obvious negative correlation between these and percentage germination.

The general behaviour of the wheat containing 14.9 per cent moisture was much the same, except there appeared to be a slight tendency for "sick" wheat to be produced at lower temperatures, since a small percentage of "sick" wheat was found also in the wheat stored at 15° and 20°C. and a trace when stored at 10°C. No samples were stored at temperatures above 25°C. and the periods of storage were not the same as for the wheat containing 12.2 per cent moisture. At 25°C. 14 per cent of the kernels exhibited visual symptoms of the "sick" condition after 357 days of storage with increasing percentages with increase in the storage period. Fat acidity increased and germination decreased with temperature and storage period, the changes in both cases being somewhat more rapid and more pronounced than with wheat containing 12.2 per cent moisture.

The percentage of "sick" kernels and the loss in viability of the wheat containing 15.4 per cent moisture were greater than for the 14.9 per cent moisture wheat. The fat acidity at comparable temperatures was about the same, but the increase was somewhat less owing to a higher level in the wheat at the beginning of the experiment. This experiment, it should be noted, was begun more than a year later and hence may not be strictly comparable with those discussed above.

One hundred per cent of the kernels of all samples of the wheat containing 16.2 per cent moisture stored at 35° and 40°C. were designated as "sick" at the end of 17 days of storage and the experiment was discontinued at the end of 210 days. Direct comparison of the results is not possible because of the difference in storage periods. It is apparent, nevertheless, that the percentage of "sick" kernels tends to be greater, especially at the lower storage temperatures and time, as in the other experiments, but the increase appears not to have been materially greater than in the drier wheat.

The low germination of the grain in this test was probably caused by treating the wheat with an excess of fumigant for weevel and moth control between the time the grain was received and the experiment begun, a period of about two months.

"Sick" wheat developed at all temperatures in the wheat containing 18.6 per cent moisture, reaching 100 per cent when stored at 40°C. As for the wheat containing 16.2 per cent moisture, the experiment was discontinued much earlier than the others, i.e., after 200 days of storage. Also as for the 16.2 per cent moisture wheat the increase in fat acidity and decrease in viability was somewhat irregular and no greater or perhaps even less than for the drier wheat stored at comparable temperatures and for similar periods of time.

Considered as a whole these experiments clearly indicate that "sick" wheat, comparable in appearance, at least, to that observed in commerce, can be produced by storage in small quantities in sealed containers and the proportion tends to increase with storage temperature, moisture content of the grain, and time.

The fact that "sick" kernels can be produced in wheat containing as little as 12.2 per cent moisture would appear to be of special interest since this is below the level often thought necessary for safe storage. It should be remembered, however, that in these experiments "sick" wheat was not observed in such dry wheat at storage temperatures of less than 40°C. and then only after 279 days of storage.

As would be expected, the increase in the percentage of "sick" kernels in any one experiment was accompanied by an increase in fat acidity and a decrease in germination. However, the increase in "sick" kernels induced by greater moisture content of the grain appears not to have been so clearly correlated with an increase in fat acidity or a decrease in germination.

In other words, increasing the moisture content of the grain increased the proportion of "sick" kernels but not the fat acidity. The decrease in germination appears to have been accelerated by increasing the moisture content of the grain, but the data are inconclusive because of differences in the original subsamples and noncomparability of storage periods.

Conclusions

The results suggest that the "sick" wheat condition is associated with anærobic conditions, but do not point to the exact cause or causes of it.

It is thought that the "sick" wheat may be produced by suffocation of the grain, resulting from the respiratory consumption of molecular oxygen in the surrounding air. However, the possibility of deterioration by fungal action before mold growth can be detected by the naked eye, as mentioned by Larmour, Sallans, and Craig (1944), should not be overlooked. Tervet (1945) has indicated that there is a strong and immediate effect of certain mold spores and cell-free staled culture medium on the germination of healthy (soybean) seed.

Other possibilities which should be investigated are the effect of anærobic respiration of the seeds with accompanying chemical changes in the substrate material and the production, through respiratory processes, of end products toxic to the embryo.

The relation of these results to the occurrence of "sick" wheat in commercial storage has not been determined. Obviously the conditions are quite different, especially as regards the quantities of wheat involved. The fact that "sick" wheat was produced artificially under anærobic conditions and without visible evidence of fungi appears to support the belief that the reduction in oxygen pressure in large storage bins is a contributing factor.

"Sick" wheat was produced artificially by storing sound wheat containing different amounts of moisture in sealed quart Mason jars at various temperatures in temperature-controlled cabinets, the proportion of "sick" kernels in general increasing with the moisture content of the grain, the temperature of storage, and the length of the storage period. There was no visible fungus growth on the

wheat such as usually take place when moist wheat is exposed in the open air, except in a few jars and these were discarded.

Wheat containing 12.2 per cent moisture stored at 40°C. developed "sick" wheat symptoms when stored 279 days or longer, but not when stored at a lower temperature. A small percentage of "sick" wheat was produced in 32 days in wheat containing 18.6 per cent moisture when stored at 5°C, and up to 100 per cent "sick" kernels when stored at higher temperatures and for longer periods of time. The development of the "sick" wheat condition in general was accompanied by loss in viability and increase in fat acidity.

A type of damage in stored wheat known in the trade as "sick" wheat has been recognized since about 1921. It occurs both in terminal and country elevators, especially in the former, but is rarely found in farm storage. A unique feature is its occurrence without obvious heating of the grain such as usually takes place when damp grain is stored in large quantities.

The grain trade defines "sick" wheat as a type of damage characterized by kernels having a dull, lifeless appearance (other than "Tombstone") which may be accompanied by a mouldy appearance of the germ or by mould in the crease. This condition may be associated with a discoloration of the body of the kernel resembling slightly heat damaged grain.

"Sick" kernels develop deadened germ ends, easily distinguished as damaged by their black or brownish appearance when the germ is exposed. This type of damage is sometimes accompanied by a musty odor. In the present paper the authors have used the definition of Geddes (1943) who has defined sick wheat as that "in which the seed loses its viability and the germ darkens in color and becomes rancid." The quality of "sick" wheat as shown by bread-baking tests is distinctly poor ,although better than that of heat-damaged grain.

STATIC WRECKS VITAMIN A IN SOYBEANS

A recent visitor to our office reports that some investigational work he just conducted on the unexplainable high loss of vitamin A content in soybeans was definitely found traceable to static.

A study indicated that soybeans are susceptible to carrying a static charge because of the high oil content.

It was also learned that as long as the static charge remained in the beans that the weed seeds continued to ride on top of the beans right through the cleaner.

No difficulty was experienced in removing the weed seeds after the static was eliminated.

As soon as further data is available it will appear in these columns.

DOWN TO EARTH VIEW PROVEN IN ONE FIRM—WITHOUT STRIKES

By Stanley H. Garrity,
Attorney-at-Law, Kansas City, Mo.

Before the Kansas City SOGES Conference

My connection with the grain and processing industry is from an early date. Part of my education, as a kid about the time of the first World War, was on the business end of a pitchfork. That was when you started to work at sunup and quit at sundown, and the standard rate was $1.00 per day. The question of wages and hours and the relation of employee and employer and other things at that time had not reached the political and social spiral as it is now.

A matter of a year or two ago I happened to be out in western Kansas (and I'm mentioning this to illustrate a point), to look over the fields where as a kid I was on that "business end of a pitchfork" and I saw a big combine operating in the same field where I had worked years earlier. It disposed of a section of wheat out there in an afternoon.

Nothing But Changes

I could not help but think of the changes that had taken place in this industry between the first World War and the second. All during that time I know the grain plant superintendents experienced the same change. There have been vast changes in methods of operations, changes in equipment, methods and not the least of those was changes in labor.

As a matter of fact the labor scene and the labor laws as we have them today is largely the result of the development between the first World War and the second World War. That is the period of time in American history, as we look back when we can say it was the beginning of labor relations. I don't think there is any doubt about that but if there is all you have to do is think about it a moment. In the first place, at the close of World War I and the few years immediately following, we had the first real problems of labor to be presented to American industry.

Here to Stay

Just what the future holds, I do not know. There are a few things I think are fundamental which, in light of my experience, I think I could summarize.

First, the labor organizations are here to stay, and we might as well admit it; we might as well take it in good grace because we are going to have to.

Now what about this problem of having labor unions?

They are fairly new to most every one because we have not had them for any vast number of years, in fact they have been organized to a great extent since 1937 or shortly thereafter.

Ideal Plan

In all the industries which have been unionized for many years, I think of one industry I happen to

know something about—one particular company which had been organized at about the time I was born. It always has had a very strong labor organization. It employs thousands of men, but there has not been a labor strike in that company in 33 years.

The last strike they had was many, many years ago. There were some people killed and a lot of struggle. But the management of that company got together and spent a lot of time in building up and developing a labor relations department.

I have no current knowledge about the production of the employees of that particular company, but I have heard that now all the employees have an attitude toward their employer that is completely admirable. They think they work for the "best darn" company in the world, and they are justified in their thinking because many years ago this company started out to develop a labor relations department by which they educated their employees to the fact that their employer was interested in them.

"First Name" Rule

They have a rule in that company, in connection with labor relations, that the immediate superior of every employee must personally know every employee under his supervision by his first name, know about his family and all that sort of thing.

He is required from time to time to give reports to his superiors about the personal relations of the employees under his jurisdiction.

Now you may say that is a lot of tomfoolery.

Well, it has had this effect; whenever an employee was a little hard up and needed some money, instead of going to a loan shark he went to the employees' association where he was loaned the money—enough to get married, or have a baby, have an operation or maybe buy a home.

They might have loaned him money for any one of a hundred different things. And since the employees themselves are financially interested in that employer's loan association, *THEY* pass on whether or not their fellow employee should or should not be granted the loan. You say that gets out of hand—and occasionally it does.

They Love Their Work

But by labor relations and leadership on the part of the company it has been able to build up the welfare fund to a point where it would put many union's welfare fund to shame a thousand times. They've built up a welfare fund and all sorts of associations. They've got a pension plan that the employees themselves contribute to, which costs the employer very little, by which each employee is pensioned when he has finished a certain period of work.

These employees think their employer is the finest in the country. The reason they do is because they like their jobs and they like their boss—and their boss knows them by their first names.

Personal Advice

If they think enough of you to come and talk about their personal affairs, you've got an employee that

will be a good man and he'll give you a day's work when you ask him.

The labor relations of that company have been such over a period of years that they have developed through their superintendents' group, their junior executives, and on down to the lowest foremen and straw-bosses, the proposition that he knows what the problems are of the men under him. He knows their names. He knows all about them. So when some guy comes in from Moscow or some other place and undertakes to make a "Red" out of that man, he's going to run into trouble.

"Heads-Up" Plan

I think that's the type of "heads-up" labor relations that will accomplish things for American Industry. It doesn't happen over night, and you can't start today and hope to have it working tomorrow. That isn't true of anything—it takes 15 or 20 years to "grow" up.

It takes time to develop people, but if we approach the problem of real labor relations wherein we are willing to think about the man from the standpoint of his having some "beef" and wanting to be heard—instead of telling him to "go to blazes"—I think we probably would get started in the right direction. In my office we have probably 100 employees. We try to know our people, and I know it helps even though it doesn't always prevent some troubles. Sooner or later all of us will have to come to this way of understanding. We must try to learn of each other's problems, stand our own ground, know our own rights and privileges, and deal fairly with them.

You Can Help!

Careful Grounding Will Reduce Threat Of Fire From Static

The Hazards of Static Electricity In Grain Handling and Processing Plants

BY C. M. PARK

ASSOCIATE A.I.E.E.

MUTUAL FIRE PREVENTION BUREAU, CHICAGO

THE purpose of this discussion is to call attention to the occurrence of static electricity in grain handling and processing plants, to describe conditions under which static electricity may introduce danger of explosion or fire, and to outline protective measures which may be taken to guard against this danger.

The generally accepted theory that static electricity is generated by contact and separation of dissimilar substances served very well to explain the occurrence of this form of electricity in grain handling and processing plants. Belts running on pulleys, grain and other materials flowing in spouts, materials entering and leaving bucket elevators or being fed to and discharged from belt conveyors, grain and other stocks falling freely through air, and dust-laden air passing through ducts and collectors, are all typical of conditions under which appreciable quantities of static electricity may be generated.

Sources Checked

About ten years ago a series of field investigations were undertaken to determine the prevalence of sources of static electricity in grain and milling properties. No attempt was made to measure voltages or the rate of energy generation, but detectable static accumulations were indicated in a surprisingly large number of places. In connection with this investigation, it was found that one of the small Neon type fuse testers coud be used as a sensitive and convenient means to detect the presence of static.

Conditions in several flour mills were investigated during the cold weather when the buildings were heated and relative humidity was low. Evidence of static electricity was *FOUND IN WHEAT* being discharged from bucket elevators. It was found on metal linings of wood spouts, and on ungrounded metal bins and hoppers. Ungrounded metal dust collectors in several cases were found to be heavily charged. Practically all leather and rubber belts were found to be generating static, and rubber V-belts were particularly active generators.

It was especially significant that ungrounded belt guards and similar metallic masses in close proximity to belts tended to accumulate charges of static, and in one case the rate of accumulation on a metal belt guard was sufficient to produce a four-inch spark discharge at approximately 15 second intervals.

Heat and Low Humidity and Static

In unheated grain elevators the tendency to generate static electricity was much less noticeable than in heated flour mills. During periods of low atmospheric humidity, however, it has been possible to detect static in grain streams, on ungrounded metal spouts and hoppers, and on ungrounded metal dust collectors and sections of metal ducts handling dust-laden air.

In one particularly interesting case, where grain was falling freely from a spout into a reinforced concrete grain bin, a faint luminous haze was observed above the surface of the grain in the bin when a metal tape was lowered into the bin to measure depth of the grain, and spark discharges from six to eight inches long occurred from the tape to the metal ring surrounding the manhole in the top of the bin.

The investigation indicated that static electricity is prevalent in flour mills during seasons when the buildings are heated and that it may occur in unheated buildings at times when atmospheric humidity is low.

It is apparent that atmospheric humidity affects the occurrence of detectable accumulations of static, and this conclusion is supported by investigations made during the heating season in mills equipped with air conditioning apparatus for controlling both temperature and humidity. In such mills little evidence of static electricity could be found when the relative humidity was 50 per cent or more.

High atmospheric humidity would not be expected to affect the generation of static, but it does tend to maintain films of moisture over the surfaces of nonconducting paths which permit the flow of sufficient current to neutralize static charges as rapidly as they are generated.

Principal Hazards

There are two principal hazards associated with static electricity in grain and milling plants .The first is the danger of personal injury resulting from the reaction of employees when subjected to shock from a static discharge. Where such shocks occur in the vicinity of fast moving belts and machinery there is definite danger that a man will jump back into a belt or machine and be seriously injured.

The second serious hazard is the possibility that combustible dust may be ignited by a static discharge. Where dust is suspended in air such ignition might cause a dust explosion, and the ignition of static accumulations of dust by a static spark

could result in a serious fire loss. It is usually difficult to establish a static spark as the source of ignition in a dust explosion, but a substantial number of fires have been caused by static spark ignition of dust deposits.

It should be understood that the generation of static electricity does not in itself constitute a fire or explosion hazard in a grain or milling plant. When static is generated at least one of the dissimilar materials involved is usually a nonconductor of electricity.

The discharge of static from such a material will be made up of minute discharges from individual fibres or elements of the material, and will be in the form of a brush discharge having a faint blue color.

That Big "If"—The Accumulation Hazard

Even though the voltage causing each such minute discharge may be high, the amount of energy represented is altogether too small to rise particles of dust and the air surrounding them to a temperature high enough for ignition. If, however, the charges from a large number of nonconducting fibres are collected on a single isolated conducting mass, a single spark discharge from that mass may represent an amount of energy equivalent to the sum of all of the individual minute charges. Under such conditions the discharge spark may have ample energy to ignite suspended dust or dust deposits.

It follows that the discharge of static electricity becomes dangerous only when static charges can accumulate on isolated conducting objects from which the sum of the accumulated charges may subsequently be discharged to some adjacent grounded conductor in the form of a *HOT* spark.

For example, a belt of nonconducting rubber bristling with static would not be hazardous unless there were ungrounded conducting objects in the immediate vicinity. It can be said, then, that the hazard of static electricity does not lie in the nonconducting material which is one of the dissimilar materials serving as the static generator. It lies in such ungrounded conducting objects in the vicinity as may serve as accumulators and store energy from a large number of minute static discharges.

Identification of the hazard associated with static electricity simplifies the development of protective measures. Attempts to collect static from belts and other generators by means of grounded combs or festoons of tinsel usually fail to provide the protection desired and in a grain or milling plant it would be impractical to attempt to collect static at all of the multitude of points where it might be generated. On the other hand it is not impractical nor particularly difficult to eliminate ungrounded conducting objects which might collect static charges from belts, moving grain or moving dust-laden air.

Humidity Control

Humidity control is the most effective general method for protecting against hazards of static electricity, and relatively little evidence thereof is to be expected in air conditioned mills. Humidity control is not generally practiced in grain elevators or in feed mills however. In such occupancies other means for the control of static must be used. In feed mills particularly the problem of static electricity will probably become progressively more serious. It has never been the usual practice to provide heat in such plants, even during cold weather, and the low relative humidity associated with artificial heat has never been a factor.

Grounding Vital

It is usually assumed that 50 per cent relative humidity is the lower limit for humidity protection against static electricity. When atmospheric humidity may frequently fall below that level, the only effective protection against static is grounding. Grounding, as far as static electricity is concerned, consists of providing conducting paths which can carry the small currents necessary to neutralize static charges. Such conducting paths need not have low electrical resistance to be effective.

Where belts are run on metal pulleys the static hazard can be effectively controlled by using belts of conducting rubber and by grounding machines and shafting. Questions have been raised regarding the effect of the oil film in sleeve bearings and it has been suggested that the grounding of shafting through bearing hangers might not be effec-

tive because of the insulating effect of the oil film in the bearing. Because of the area of the oil film in relation to its thickness, and because of moisture and impurities present in the oil, leakage through the film would be expected to be sufficient to prevent dangerous static accumulations on shaftings or pulleys. In several tests it was impossible to detect static accumulations on shafting which was grounded through a single bearing hanger.

Conducting rubber cup belts in bucket elevators provide an effective means for grounding the metal cups and the boot pulley if the boot is of nonconducting material. Metal leg casings and elevator head shafts should, of course, be grounded. Metal linings of grain spouts should be bonded together to form a continuous conductor and should be grounded, as should the draw-off and loading spouts for belt conveyors.

Ground All Metal Sub Hed ..f-..

Metal bins and metal hoppers or gates in concrete or wooden bins should be grounded, and it is particularly important to ground all metal portions of pneumatic systems in which dust-laden air is handled.

In fact, complete protection against static electricity must include groundings of all metallic portions of machines which may be in contact with moving grain, grain products or dust, grounding of all metal parts of belt guards and other metallic objects in contact with or adjacent to nonconducting belts, and grounding of all metal portions of elevating and conveying equipment and of storage containers.

Grounding connections should be sufficiently rugged to withstand ordinary mechanical injury, and connections to grounded objects should be secure and permanent. Groups of lines of equipment may be grounded to a common grounding conductor provided that conductor has at least *TWO* effective connections to ground.

It is apparent that static protective grounding in a grain or milling plant is likely to involve an extensive network, but where static suppression through humidity control is not practicable, there iis no other effective method of providing protection.

KRITTER NOW THE SUP

William Kritter is now Superintendent of the Zinn Malting Co. At the time of the Elevator Superintendent's convention in Milwaukee some time ago, Bill was very active in helping to to make this large affair a big success. At that time he was Assistant Superintendent of the Malting Elevator for Froedtert Grain & Malting Co. of this city—M. H. Ladd, Chief Weigher, Milwaukee Grain Exchange.

NEW ARRIVAL AT PUETZ' HOME

Lee Werner arrived April 13th at the home of Mr. and Mrs. H. W. Puetz, where he intends to spend quite a number of years growing up. Mr. Puetz has been a consistent contributor to these columns, and his many safety articles have been put to wide use.

HUBINGER NOT SOLD

Contrary to previously published reports, the Hubinger Company of Keokuk, Ia., was not sold to Clinton Industries, Inc., of Clinton, Ia.

K.C. CHAPTER ELECTS

Recently elected officers for the coming term of the Kansas City SOGES Chapter, according to Secy-Treasurer George D. Duncan of Standard Milling Co., include:

PRESIDENT — Orin E. Kinman, Cargill, Inc.

1st VICE—Paul Secrets, Waggoner-Gates Milling Co., Independence, Mo.

2nd VICE—Earl Gray, Inter-State Oil Co.

Directors selected to serve, and every officer, director and member works hard at SOGES work in Kansas City, are:

O. B. Duncan, Salina Terminal Elevator Co., chairman

Harley J. Hixson, Continental Grain Co.

William Kamp, Ralston-Purina Co.

Wilbur Thompson, Norris Grain Co.

Claude Darbe, Simonds-Shields-Theis Grain Co.

Arthur J. Olson, Cargill, Incorporated.

JIM HAYHOE DIES UNEXPECTEDLY

James G. Hayhoe, 51, assistant vice president of Cargill, Inc., of Minneapolis, died at Flint, Mich., Mar. 19, where he became ill enroute to Montreal, Que.

Long an active and interested member of the Superintendent's Society, Jim was well and widely known. In his earlier years he represented the association on the Dust Explosion Hazards Committee of the National Fire Protection Association, and also took quite an active part in the activities of the Food Section of the National Safety Council for the SOGES.

A strong advocate of all dust explosion and accident preventative measures, his counsel will be sorely missed in the Society's ranks. While in recent years his time was increasingly occupied with company affairs, nevertheless his challenging ideas were ever a stimulation to his associates in the SOGES.

Surviving are his widow, three sons, three daughters and three grandchildren.

RETURNS TO MILWAUKEE

Harry Thoms, formerly an active director of the SOGES and General Convention Chairman of the meeting held in Milwaukee several years ago, has sold his resort in northern Wisconsin and is now Assistant Superintendent of Froedtert Grain & Malting Co.

Harry was formerly Superintendent of the Kinnickinnic Elevator operated by the Stratton Grain Co., also of Milwaukee. George Collins succeeded Harry to that post.—M. H. Ladd, Chief Weigher, Milwaukee Grain Exchange.

LOSIE'S WIFE PASSES ON

Mrs. Maynard Losie, wife of F. Maynard Losie of Hallet & Carey Co., Minneapolis, passed on on March 19 after a prolonged illness.

Mrs. Losie was widely known among SOGES convention delegates, having attended a number of the association's gatherings. Always charming and hospitable, her radiant presence will be very much missed.

BILL EMMONS DIES

William W. Emmons, 87, who retired in 1933 after serving for 30 years as Superintendent of the Arcady Farms Milling Co.'s "Atlantic" Elevator on Goose Island prior to its burning down, died April 17 of a heart attack. He was a 33rd degree Mason.

CORN

Corn is a cereal that is grown in the Central States to keep the producer and the buyer crazy.

It varies in color, weight, and grade, and the man who can guess nearest its milling value, is called a grain expert by the public, a damn fool by the farmer, and a poor business man by his creditors.

The price of corn is determined in Chicago, and goes up when you've sold, and down when you've bought.

A buyer working for a large mill was sent to Chicago to study the corn market, and after a few days of careful deliberation, wired his firm:

> "Some think it will go up, and some think it will go down. I do, too. Whatever you do will be wrong. Act at once."

Corn is planted in the spring, mortgaged in the summer, and left in the elevator all winter.

You can and you can't; you will and you won't; be dammed if you do, and be dammed if you don't.

Author Unknown.

Weevil-Cide SPLITTERS

Precocious

Proud Parent: "Why, Junior is only three and he can spell his name backwards."

New Neighbor: "Remarkable. What's his name?"

Proud Parent: "Otto."

•

Close Mouthed

Mrs. A: "Does your husband talk in his sleep?"

Mrs. B: "No, and it's so exasperating —he just grins."

•

How True

"I guess I've lost another pupil," said the professor as his glass eye rolled down the sink.

•

Blabbed

A girl was bragging that she had six boy friends.

"All told?" asked her friend.

"Oh, no," she replied, "only one."

•

Desirable Substitution

Head clerk: "I'm sorry to hear of your partner's death. Would you like me to take his place?"

Manager: "Very much, if you can get the undertaker to arrange it."

•

Experienced

Traffic cop: "Don't you know what I mean when I hold up my hand?"

Old lady driver: "I ought to. I taught school for thirty-five years."

Tame

Father: "Son, who is this wild woman you're running around with?"

Son: "Aw, dad, she ain't wild. Anybody can pet her."

•

Sympathy

Patient: "This is my first operation, and I'm terribly nervous."

Young Surgeon: "I know just how you feel. It's my first, too."

•

Identified

Teacher : "Who is the laziest person in the class, Johnny?"

Johnny: "I don't know ma'am."

Teacher: "Who sits idly in his seat watching the others writing and studying their lessons instead of working himself?"

Johnny: "Oh! Why, you, ma'am."

•

Effective

First Wife: "How did you ever break your husband from staying out nights?"

Second Wife: "He came in at 10 one night and I called, "Is that you, Bill?"

First Wife: "How did that help?"

Second Wife: "His name is John."

•

Important Detail

Judge: "Have you ever been in trouble before?"

Defendant: "No, sir. And all I did was to rob my kid brother's bank."

District attorney: "Your honor, he forgot to explain that his kid brother was cashier of the First National Bank."

•

Your Witness

The irate prosecutor whirled on the defendant—"Madam," he shouted, trying to prove a vital point, "while you were taking your dog for a walk, did you stop any place?"

The courtroom crowd waited tensely for her answer.

"Sir," she answered quietly. "Did you ever take a dog for a walk?"

Toothache

A Chinaman had a toothache and phoned a dentist for an appointment.

"Two-thirty all right?" asked the dentist.

"Yes," replied the Chinese, "Tooth hurtee, all right. What time I come?"

•

Uncongenial

He: "Do you smoke?"

She: "No."

He: "Drink?"

She: "Naw."

He: "D'ye eat hay?"

She: "Nope."

He: "Gosh, woman, you ain't a fit companion for man or beast!"

•

The Girl for Him

A Scotchman telegraphed a proposal of marriage to his sweetheart. After waiting for an answer all day, he finally received an affirmative reply early the next morning.

"If I were you," said the operator, "I'd think twice before marrying a girl who kept me waiting for the answer so long."

"Na, na," replied the Scot. "The lass for me is the lass who waits for the night rates."

•

Romance

The mathematics prof and his fiancee were out roaming the fields when she plucked a daisy and, looking roguishly at him, began to pull off the petals, saying: "He loves me, he loves me not-"

"You are giving yourself a lot of unnecessary trouble," said the prof, "You should count up the petals, and if the total is an even number the answer will be in the negative; if an uneven number, in the affirmative."

The Cards Are On The Table

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Specification "A" costs more; it's worth more; it lasts longer and that's why it counts. Cheap materials and faulty workmanship represent false economy.

SPECIFICATION "B"

As compared with the Gibraltar qualities of Specification "A" might well be likened to a suit of armour.

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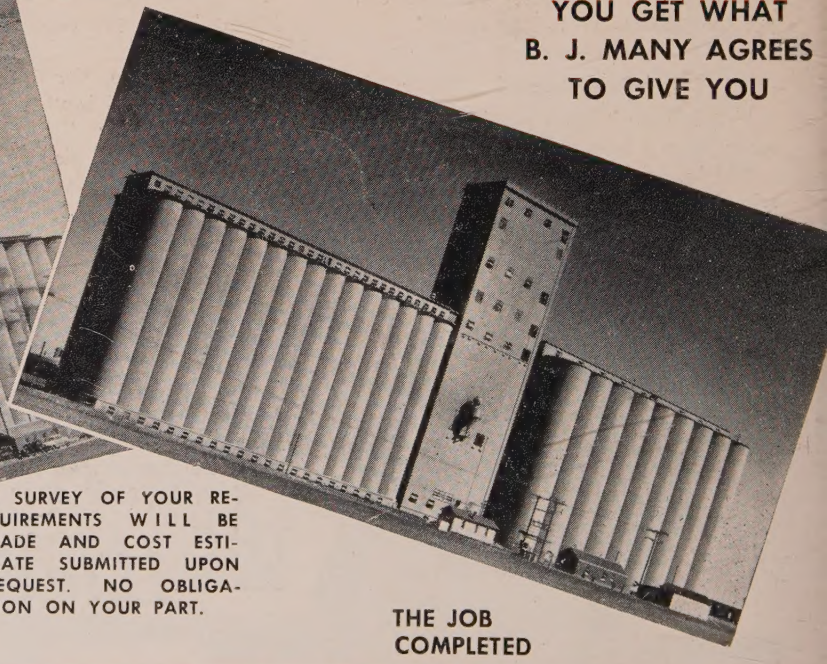

THE JOB COMPLETED

B. J. MANY CO., Inc.

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827 N. W. 31st Street, Oklahoma City, Oklahoma—217 Baltimore Life Building, Baltimore, Maryland—1101 Francis Palms Building, Detroit 26, Michigan—3723 Grand Central Terminal, New York 17, New York—Mr. H. W. Webb Peploe, 500 Rona Street, Interlaken, New Jersey.

AUTHORIZED AGENTS: Pioneer Sand and Gravel Company, Inc., 9901 Fairview Avenue, North, Seattle 11, Washington—Northland Machinery Supply Co., Ltd., 203 Hardisty Street, Fort William, Ontario—Northland Machinery Supply Co., Ltd., Winnipeg, Manitoba—Asphalt Services, Limited, 366 Adelaide Street West, Toronto, Ontario.